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THE Oriental PERSIMMON

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THE ORIENTAL PERSIMMON

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The fruit discussed in this leaflet is more commonly referred to as the Japanese than as the oriental persimmon. Most of the varieties that have been introduced into the United States have come from Japan. However, the species *Diospyros kaki*, as it is known botanically, is native to China and was introduced from there into Japan. The term "oriental persimmon" seems, therefore, an entirely appropriate designation for this fruit.

The Japanese Persimmon in the United States

The Japanese persimmon is far from being a new fruit in this country. The earliest date of introduction commonly recognized is 1856, Commodore Perry having sent seeds from Japan to Lieutenant Maury in that year. Later, trees of named varieties were imported from the Orient, mostly from Japan, and gradually a considerable number of sorts became known here.

However, variety names of fruits apparently do not always mean the same in Japan that they do in this country. In any event, a good deal of confusion in variety names early became apparent. The same name was sometimes applied to different varieties, and the same variety seemed to exist under more than one name. This confusion in varietal identity is by no means a thing of the past.

Table 1, which shows the number of Japanese persimmon trees in the various States, as reported by the 1930 census, indicates in a general way their distribution.

Table 1.—*Japanese persimmon trees in different States, census of 1930*

State	Trees not of bearing age	Trees of bearing age
	Number	*Number*
Virginia	787	750
North Carolina		8
South Carolina	127	6
Georgia	259	6,959
Florida	17,019	13,041
Alabama	4,033	5,602
Mississippi	1,080	1,848
Arkansas		13
Louisiana	625	791
Texas	1,763	6,603
Arizona	1,252	95
Oregon	31	11
California	96,914	98,296
Total	123,890	134,023

Although the figures for the 1930 census are out of date, no more recent information is available except for California, where 1,570 acres of Japanese persimmons were reported in 1938, practically all of which were in bearing. It is doubtful if there has been any substantial increase in the number of trees in the Southeastern States since 1930.

A negligibly small number of trees not enumerated in the census are grown in southern Maryland, eastern Tennessee, and perhaps in a few other sections.

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The trees appear to be hardy in southeastern Virginia in areas adjacent to the lower Chesapeake Bay and the Atlantic Ocean. They are not dependably hardy in the vicinity of Washington, D. C., although trees in that section may survive and bear fruit for a considerable period of years. Southward, the trees are widely distributed in Florida, but most of them reported from that State are in the northern counties. A large number of the trees in California are in the southern part of the State, but relatively heavy plantings have been made in the central portion and elsewhere.

Variety Characteristics and Problems

The confusion that exists in the identity and nomenclature of oriental persimmon varieties has been mentioned. In this respect conditions are much improved over what they formerly were, but there is still a great lack of information among growers regarding the identity of their varieties, and the means of gaining such information are imperfect and unsatisfactory.

One difficulty in variety identification is the difference in the same variety under different conditions and even on the same tree. For instance, some varieties set and develop fruit, or not, depending on whether the blossoms are pollinated, and at least one variety will develop fruit even if not pollinated.

In some varieties the flesh of the fruit is always light-colored, whether seeds form or not. In others the flesh is light-colored in seedless fruits, but where seeds form there is a zone of dark-brown to nearly black flesh about each seed. If several seeds develop, the entire fruit is dark-colored. So far as known, the dark-colored flesh is always sweet, that is, it is nonastringent and may be eaten while the fruit is still hard. On the other hand, light-colored flesh is astringent (with only one known exception—in the Fuyu variety) until it softens. In some varieties the astringency disappears as the fruit begins to soften; other varieties must be in a thoroughly ripe, jellylike, or custard consistency before they are free from it.

There are also differences in size, shape, time of ripening, and texture of flesh, with respect to whether seeds develop or not, and as many of these differences may appear in fruits of the same variety and on the same tree, the chances of confusion and uncertainty as to varietal identity are many.

Pollination Problems

There are pollination problems with oriental persimmons, as there are with many other kinds of fruit. Some varieties of persimmons will develop their fruit to maturity without pollination, whereas most varieties drop their fruit prematurely or fail entirely to set fruit without pollination. Typically, the pollen-producing or staminate blossoms from which fruit never develops are borne on different trees from the pistillate or fruit-producing blossoms. Sometimes, however, both types of flowers are found on the same tree, but it is unwise to depend on the staminate ones occurring in sufficient numbers on trees that are potentially highly productive to insure adequate pollination where that is necessary.

It was therefore a distinct advance when a variety, which in due course was named Gailey, was discovered that regularly bears an abundance of pollen-producing blossoms. If an orchard of oriental trees contains about 10 percent of this variety, there is not likely to be any serious premature dropping of the fruit because of a lack of pollination of the blossoms.

The fact that there are two types of flowers—pistillate and staminate—each borne on separate trees was not unknown, but that both types of flowers are sometimes produced on the same tree had been overlooked. It was this discovery, with the further observation that the occurrence of staminate (pollen-producing) blossoms on a tree was sporadic, developing one season and not again perhaps for several years, if ever, that offered the explanation as to why some trees occasionally produced a crop and failed at other times. It is in this connection that the Gailey variety, previously mentioned, is important. It regularly produces every year an abundance of staminate flowers that are dependable for their pollen; and it is the only known variety that is regularly dependable in this respect.

Again, the pollination requirement of oriental persimmon varieties is not a fixed character. H. Harold Hume, of Florida, has brought out the fact that whereas in some localities pollinizers are not necessary for their fruitfulness, in others they make the difference between crop failure and success even with the same varieties. Why a variety will fruit abundantly without pollination under some conditions, and under others will require pollination, is not at present known.

The varying effects of seed development in different varieties on the color of the flesh has been mentioned. Seed development is the result of pollination. On the basis of his studies of these varietal differences, Hume has classified varieties as "pollination constants" and "pollination variants." The former group consists of those varieties the flesh of which undergoes no change in color as a result of seed development. The other group is made up of the varieties that have light-colored flesh when seedless, and dark-colored flesh when seeds are produced. No dark-fleshed seedless varieties are known.

Hume's grouping of varieties under this classification is as follows:

1 **Pollination constants.**—Group 1.—Costata, Hachiya, Ormond, Tamopan, Tanenashi, Triumph, Tsuru; also several others not of special value at present. (Camp and Mowry of Florida add Fuyu to this list.)

2 **Pollination variants.**—Group 2.—Gailey, Hyakume, Okame, Taber No. 23, Yedoichi, Yemon, Zengi; also several others not of special value at present.

Another classification made by Hume is based on blossom characters with respect to the occurrence of staminate flowers. The varieties known to produce only pistillate and never any staminate
3 flowers he terms "pistillate constants;" those that produce staminate flowers regularly he calls "staminate constants;" and those producing staminate flowers occasionally, "staminate sporadics." His grouping of varieties under this classification is as follows:

4 **Pistillate constants.** Group 1.—Tanenashi, Hachiya, Costata, Tsuru, Tamopan, Hyakume, Yemon, Yedoichi, Phelps, Triumph, Zengi.

Staminate constants. Group 2.—Gailey, and probably Masugata, Siang (S. P. I. 21910) and S. P. I. No. 27037. (Ryerson refers also to Miyotan (S. P. I. No. 47323) as a good pollinizer.)

Staminate sporadics. Group 3.—Okame, Taber No. 23, Taber No. 29.

Oriental persimmon trees come into bearing comparatively young; many produce fruit when 3 or 4 years old, reckoned from the time of permanent planting.

Principal Available Varieties

The principal varieties offered by the nurseries, named in the approximate order of ripening, with some of their characteristics, are as follows:

Zengi.—One of the smallest of the oriental varieties, and first to ripen. Skin is dark orange red in color, glossy surface with russet lines about the apex. Quality very good.

Taber No. 23.—Rather small, round to oblate in form, with flat or depressed apex. Skin rather dark red in color, with peculiar stippling effect on the surface. A good home-garden variety. Season in Florida begins in September.

Okame.—In Florida ripens about the first of September. Large, roundish oblate, with fairly well defined quarters; tends to seedlessness, though seeds occur. Skin orange yellow turning to carmine when ripe, delicate bloom, translucent in appearance.

Fuyu.—Introduced some years ago by the Division of Plant Exploration and Introduction, Bureau of Plant Industry, under the name "Fuyugaki." Fruit medium to large, decidedly oblate or tomato shape, indistinctly four-sided; skin deep red in color; flesh light orange; seeds few or none. It has the exceptional characteristic of never being astringent; hence it can be eaten while still firm like an apple. It is the only light-fleshed variety known that is nonastringent while the flesh is still hard. Productive; quality good. When grown in Florida the fruit usually has a few seeds and is presumed to require pollination there.

Jumbu.—This variety was introduced in California in 1937, where it is being planted to some extent. Like the Fuyu, it is nonastringent and may be eaten while still firm as well as after it becomes soft. Quality good. Compared otherwise with the Fuyu, it is said to be larger, slightly more conical, and ripens a few days later.

Hachiya.—Leading variety grown in California; also grown to a limited extent in the Southeastern States. A rather light bearer in some sections, especially in the Southeast; often fruits heavily in California. Sometimes referred to as the largest and handsomest of all oriental varieties. In California, it is usually seedless, but commonly has one or more seeds when grown in Florida. Form is oblong-conic; apex rounded, terminating in a black point; skin glossy, deep orange red; flesh deep yellow, astringent until soft. Rich, excellent quality. The cover illustration shows a view in a Hachiya orchard in Orange County, California. The trees are about 4 years old.

Tanenashi.—By far the most important variety in the Southeastern States, being to this region about what the Hachiya is to California. It has the advantage of developing its fruits to maturity without pollination. Fruit medium to large, broadly conical with somewhat pointed apex; skin bright light orange, changing to light red when ripe; flesh yellow, nearly always seedless, astringent till ripe, a rather characteristic pasty texture. Very good quality. In season in Florida in September and October.

Triumph.—Small to medium in size, oblate or tomato shape, indistinctly quadrangular. Skin red or reddish yellow, frequently with grayish cracks about apex; flesh yellowish, usually with few seeds. High quality, which with rather small size and long ripening period makes it especially desirable for home planting. Season in northern Florida begins in September and continues till mid-November.

Hyakume.—Fruit large, varying in form, roundish oblong to roundish oblate, somewhat four-angled; skin buff yellow to light orange, usually somewhat netted or "leather-cracked" about the apex; flesh meaty, moderately rich, fairly good quality. Not especially attractive in appearance.

Yemon.—Medium size, oblate, and four-sided or quadrangular; skin light orange red to scarlet, with heavy grayish bloom; flesh yellow to red near skin, cinnamon color surrounding seeds. Fairly rich, good quality, but too soft for handling.

Tamopan.—The only variety of the oriental group of persimmons established in this country that had its origin in China. It was introduced in 1905 by the late Frank N. Meyer, agricultural explorer. It is very large, oblate, generally tending to be four-sided and with a peculiar equatorial constriction extending entirely around the fruit placed usually somewhat above the middle, but varying in its position in fruits from different trees, though uniform in fruits from the same tree. Skin reddish orange; flesh light orange, very juicy, astringent as a rule until fully ripe, but said to be nonastringent while immature in some localities in China and Japan; seedless or nearly so, and of moderately good quality though lacking in richness. It ripens rather late, the bulk of the fruit in Florida being in season in November.

Costata.—Fruit medium to large, conical, pointed. Skin reddish to deep red when ripe, heavy bloom; flesh whitish yellow, granular, usually nearly seedless but sometimes has one or two long oval seeds. In season in October and November.

Eureka.—Fruit medium size, oblate tomato-shaped; introduced to the trade some years ago from Texas. Is reported to withstand rather severe drought conditions and to endure lower degrees of temperature in winter than is expected of most varieties. Its dessert and other qualities are spoken of in favorable terms. In season in November.

Tsuru.—Fruit large, long conical, longer in proportion to size than any other variety. Skin bright orange changing to red as it ripens, heavy purple bloom when immature; flesh dark yellow, granular, astringent until very ripe, sometimes ripening unevenly and with few or no seeds. Very late in season.

Ormond.—Fruit small to medium, oblong conical, slender, pointed, skin reddish yellow with thin bloom. Flesh orange red, especially near center, meaty, only moderately juicy. Ripens very late (November and December in Florida) and may be kept for a long time after harvest.

In addition to the foregoing varieties, reference must be made to:

Gailey.—Fruit small, roundish to oblate conical, apex rounded, terminating in a small sharp point, often marked with circular lines. Skin dull red in color with rough pebbled surface. Not of value for its fruit, but the one variety that produces an abundance of staminate (pollen-producing) blossoms and is dependable as a pollinizer for other varieties. In planting varieties that require pollination, the Gailey should be included at the rate of one tree to every 8 or 10 of the other varieties.

Propagation

The usual method of propagation is by grafting on seedling stocks. In the South seedlings of the native persimmons are almost universally used for this purpose. They have been used also in California, as have seedlings of the oriental persimmon itself. But another species from the Orient, *Diospyros lotus*, has now come into rather general use in California. The stock is cut off at the surface of the ground, and the graft union made at this point. Grafting is done as spring approaches, but when stock and scion are perfectly dormant. Propagation by budding is possible but is less successful than grafting.

Native persimmon trees already well established and of considerable age can be top-grafted in early spring before growth starts with scions of the oriental sorts. In top working, the cleft-graft method is generally employed unless the limbs to be grafted are less than an inch in diameter. If the branches are small, the whip- or tongue-graft method is used. The latter method is usually employed in grafting small seedling stocks.

Soils

Oriental persimmons require no special type of soil, but will do well on almost any reasonably fertile soil with a deep friable subsoil. Although good results are obtained when trees are grown on rather light soils, the trees often do well in some of the rather heavy types of soils. Good drainage, such as is required for other kinds of fruit trees, is essential. Not infrequently oriental persimmons are seen growing and fruiting well on rather poor soil, as is true of native persimmons, but such soil conditions are not to be recommended for the best results.

Planting

Before planting, the soil must be thoroughly prepared, and if lacking humus, this should be supplied through heavy applications of manure, or by the use of green manure crops, such as velvetbeans, sweetclover, cowpeas, or some other suitable crop, preferably a legume. Deep plowing is important, also subsoiling, unless the subsoil is sufficiently friable without it. The persimmon is not an easy tree to transplant because of the very deep penetration of the taproot; and, further, there are but very few small fibrous roots at the time the trees are usually dug, and a considerable portion of these are likely to be lost by the time the tree reaches its destination and is ready for planting. Because of this lack of small roots, the root system seems to begin functioning less readily after transplanting than is the case with most deciduous fruit trees.

Trees that have made but one season's growth (1-year-olds), or at the most two seasons, in the nursery are doubtless better for transplanting than are older trees. This is true if for no other reason than because of the deeper penetration of the roots of older trees and the correspondingly greater difficulty in digging and transplanting them. The details of planting do not differ from the planting of other kinds of trees aside from those incident to the differences in the root systems.

Four or five branches should be selected to form the top, and all others removed. The branches that remain are usually cut back somewhat, as is done with other fruit trees.

The distance between trees should be about the same as for peaches; that is, 18 to 20 feet each way, though some growers prefer a distance of even 25 feet between the trees.

As oriental persimmons are grown in regions where the winters are comparatively mild, planting may be done at almost any time when the trees are thoroughly dormant and the soil is in suitable conditicn for working.

Cultivation and Maintenance

Oriental persimmon trees are commonly planted about the buildings, in yards, and in other places where they get little or no cultivation or other attention, and they often appear to thrive well and fruit abundantly under such conditions. However, they respond freely to good tillage and frequent cultivation until midseason. The same tillage practices commonly employed in maintaining a peach orchard are applicable also to oriental persimmon trees.

The same is likewise true, so far as experience and observation indicate, with reference to maintaining the fertility of the soil. To get the best results the soil must be reasonably fertile. The trees normally produce heavy crops of fruit. They cannot continue such production year after year in poor soil without becoming much depleted. The same principles underlying the use of manure, green-manure crops, and commercial fertilizers in good orchard management for peaches, apples, or other tree fruits apply also in the maintenance of oriental persimmon trees. No uniform practice prevails with respect to the use of fertilizers.

The same general practices in irrigating other fruits grown in regions of restricted precipitation apply in irrigating persimmon orchards.

Pruning

Oriental persimmon trees do not branch profusely and hence do not develop as dense tops as do many other kinds of fruit trees. Therefore pruning to keep the tops open to sunlight does not require much attention.

Pruning usually consists mostly in cutting out an occasional branch that is crowding a more important one, in removing any deadwood, and in cutting back any limbs that develop growth out of proportion to the general symmetry and form of the tree.

Marketing

The commercial aspects of the oriental persimmon industry have not developed many distinctive features.

In packing for distant shipment, the six-basket peach crate or Georgia carrier is commonly used in the Southern States, the fruit being wrapped and placed in the individual baskets in substantially the same manner as peaches. Four-basket flats, such as are used in shipping tomatoes in some sections, as well as other types of containers, are also employed more or less. In the West, the standard peach crate is commonly used, packed with either one or two layers, depending on the size of the fruits.

An important feature of marketing is the picking of the fruit at the proper stage of maturity. This should be done when full size has been attained, but before the fruit begins to soften.

The stem of the fruit is rather woody, and in removing fruit from the tree the stem should be cut with clippers, as in harvesting citrus fruit, rather than pulled off, as in harvesting apples or pears. The fruit can be held for considerable periods in cold storage, although comparatively little is known about what constitutes optimum storage conditions.

Uses

The satisfaction with which the fruit is consumed will depend in no small measure on its being used at the proper stage of maturity. Close attention to varietal characteristics is required. The "sweet" varieties may be eaten when still hard; the astringent sorts must become thoroughly ripe to avoid the "pucker," which is of varying degrees of severity at different stages of maturity. With some varieties it disappears when the fruit begins to soften; with others, the flesh must reach almost a jelly stage before it is really good to eat. In such cases the fruit is eaten with a spoon.

In this country the fruit is used largely in the fresh state, being eaten out of hand or with a spoon, depending on its condition and consistency at the time of consumption. A very popular way, with those who have tried it, of eating the soft jellylike fruits is to chill them in an ice box or refrigerator overnight and then eat them as a breakfast fruit with cream, and a little sugar if desired.

The use of Japanese persimmons in other ways than in the fresh state has been given some consideration. As flavoring for ice cream, the pulp may be used the same as peaches, strawberries, and other fresh fruits. It may also be used in making marmalade, in puddings, salads, and the like.

In the Orient, and especially in China, great quantities of the Tamopan variety are frozen in the open air and held for transporting and marketing in a frozen state during the winter months. Large quantities of the fruit are also dried and held in this condition for future use. Drying has been practiced to a limited extent in California, though this method is not common.

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